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// SOME INFORMATION ABOUT WINGED BEAN IN COSTA RICA

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#### RESUMEN

El presente documento resume los pocos trabajos que se han realizado en el CATIE y en el Ministerio de Agricultura de Costa Rica para obtener líneas adaptadas de frijol alado en la región y su posible uso en los Sistemas Agrícolas que comúnmente se usan en las zonas de Costa Rica y otras regiones de América Latina. El frijol alado se está adaptando bastante bien en Costa Rica, pero tendrá que competir en su uso con otras leguminosas nativas bien adaptadas y de amplio uso entre los habitantes de estas zonas, tanto para consumo humano, animal y como base de la industria.

#### SUMMARY

The present report summarizes the work done at CATIE and the Ministry of Agriculture in Costa Rica in order to obtain some adapted material of winged bean for this area and the possible use in the cropping systems that are in common use in Costa Rica or other Central American Regions. The winged bean is adapting well in this region but have to compete with other common legumes of the region that are very well adapted and largely used as human or animal food, and in the industry.

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### INTRODUCTION

Most of the Latin American countries have large extensions of land under wet tropics. The climatic conditions of some of these countries are modified by high mountains as the Andes and the Central American Plateau. The basic staple food of most of these countries are some cereal grains and legumes. Common bean (Phaseolus vulgaris L.) is the most important species in this region, but its cultivation under hot wet tropics is limited by disease problems (2). Some other legume grains had been introduced to replace common beans. Different species of vigna were tested; V. unguiculata has shown to be the best adapted to this area. Winged bean (Psophocarpus tetragonolobus (L.) DC.) is one of the tropical legumes with good potentials and has been recently introduced in Latin America (Pinchinat, 1976).

Most of the wet American Tropics have been identified as areas of severe protein deficiency (2). Being the winged bean a legume with a high nutritive value, we believe that with intelligent research and extension programs we can exploit this protein rich plant. This legume is reported not only rich in protein but in oil content (15-18%) in its

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seeds, which is of high industrial value (3). This consideration justifies to put some attention to this species mainly due to the high yielding potential.

CATIE is very much concerned about the problems related to the production and consumption of this legume in these countries, particularly its acceptability and palatability for human and animal consumption.

Because of the extensive use of some species of Phaseolus and Vigna in this region we have to test the winged bean against some of this species to be sure that we have more protein, quantity or quality and that people could use it as grain as well as a vegetable for human consumption.

We think that one of the ways to introduce it in the market, could be as a canned, precooked food, eliminating any undesirable flavor or substances.

Among the more important uses of winged bean in tropical America could be in industry to obtain oil (15-18%), but this crop has to compete efficiently with soya, oil palm and other oil crops in the wet tropics; fortunately winged bean could be a small farm crop to be grown by farmers of low income, that are in a large number in the region.

#### Material planted at CATIE

Dr. Antonio Pinchinat (Plant breeder of CATIE) introduced seeds from different sources. One group of plants was planted at Turrialba in 1975, and he harvested four different lines of seeds.

The Genetic Resources Program of CATIE planted some seeds selected from this original material on basis of their better adaptation and high yields. Some of the plants were selected and classified according to different characteristics of the flower, pods, stems and others. The Program is planting large experimental areas in order to use as green manure, because of its high production of organic matter and its great number of nitrogen nodules.

Elmes 1976, reported that the Rhizobium of the winged bean is in the same compatibility group of Vigna. Vigna species are widely cultivated in Latin America, suggesting that minor problems will be expected in its nitrogen fixation by the use of cowpea group strains or some other vigna species.

At the moment the Genetic Resource Program at CATIE is accumulating information of several lines planted during 1977. Unfortunately, the information was not available, but in the next few months this will be produced.

#### Material planted at Guápiles

Other group of seeds was sent to Mr. Roger Meneses at Guápiles in the Atlantic Coast of Costa Rica. He planted four varieties in Los Diamantes Experimental Station of the Ministry of Agriculture, on December of 1975. The varieties are: Chimbu, UPS-31, 799.2-B and Coll. 993. He planted in rows 1.3 m apart and 1 m within the row, some of the seeds did not germinate so they were replanted.

At the beginning the seedlings were growing very slow due possibly to a dry spell during the following months to planting. This first

planting was damaged by rabbits, then they protected it with metallic fences.

Table N° 1 contains some information of the varieties planted at Guápiles.

The first flowers appeared during March of 1976 (7th), in the UPS-31 variety. The 16th of April they harvested the first three pods that gave 20 seeds. This was the earliest variety of the group.

The 'Chimbu' variety gave pink pods and its first pod was harvested the 18th of April giving 5 seeds. The pod was 9 cm long and 7 cm of external circumference.

On May 12th he harvested 5 more pods of the UPS-31 variety that gave 39 seeds and had a mean length of 11.5 cm and the circumference of 7 cm. The basic color was green with the wing of pink color. Seven days later he harvested 1 small pod with 4 seeds.

From the 'Chimbu' variety he harvested on the 21st of May 2 pods that yielded 25 seeds one of the pods had 29 cms long and 8 cm of circumference giving 19 seeds. The other one had 14.5 cm long and 9 cm of circumference giving 6 seeds.

The other varieties began to produce from the 4th of June.

The mean of length and the number of seeds of the four varieties is presented in Table 1.

Varieties number 1 and 3 had very long pods, one of the pods of variety N° 3 was 33 cm long, with 20 seeds, and was harvested at the end of the season.

Varieties N° 2 and 4 were not very well adapted and had a lot of problems.

TABLE 1 Mean large of the pod and mean number of seeds of the 4 varieties planted in Los Diamantes, Guápiles 1975.

Variety	Mean Length cm	Mean Number of seeds	Number of pods
1. 799.2-B	22.89	13.22	22
2. Coll. 993	12.90	8.50	16
3. Chimbu	19.88	8.33	24
4. UPS-31	17	5.42	12

All the seeds of this harvest were stored, only the roots of variety N° 4 were harvested, on the 9th of July of 1976, and presented two short white roots.

In Boliche Experimental Station, Ecuador, the Bean Program planted in the field a few seeds received from CIAT, Colombia in 1974 and harvested some seeds that were classified in four groups according with their color. In 1975 the four lines were planted separately, unfortunately most of the plants were attacked by virus and only a few seeds were harvested. No more planting were made from this material.

Other seeds from different origins were planted in different low valleys of the Andes, but no information was available until March 1977.

CATIE has plans to introduce winged beans in the cropping systems research of regions where common bean or other legumes are difficult to cultivate. We are looking for the best adapted variety and the best way to use it. We foresee that the farmers of this region will need a convincing evidence of the food, palatability and cash values to use a new crop in their systems, because of their agricultural tradition with common beans.



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## BIOGRAPHICAL SKETCH

The author was advisor of the bean program of Boliche Experimental Station at INIAP, Ecuador when they began to work with winged bean, and now he is working at CATIE Turrialba, Costa Rica as Agronomist in the Cropping System Project.